



e-ISSN: 2319-8753 | p-ISSN: 2320-6710

IJIRSET

International Journal of Innovative Research in
SCIENCE | ENGINEERING | TECHNOLOGY

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 10, Issue 5, May 2021

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 7.512

9940 572 462

6381 907 438

ijirset@gmail.com

www.ijirset.com



Depression Detection Using Machine Learning

Vidyadevi Salunkhe¹, Harshada Gangane², Shrutika Awlankar³, Kshitija Bhosale⁴,

Prof. Govind Pole⁵, Prof. Gopal Deshmukh⁶

U.G. Student, Department of Computer Engineering, MES College of Engineering, Pune, India^{1,2,3,4}

Department of Computer Engineering, MES College of Engineering, Pune, India^{5,6}

ABSTRACT- If a person is unable to reconcile with his/her ability to deal with the demands put on him/her, it creates stress and induces mental health pressure. There are also different kinds of problems. Psycho-logical equilibrium disruption may normally be defined as depression. Depression diagnosis is one of biomedical engineering's main research areas, as proper prevention of depression could be easy. Many bio signals are possible. These signs suggest distinctive shifts in the induction of depression, which are helpful in recognizing levels of depression. In this project, we are using Twitter tweet as the primary candidate due to the easily accessible recording. Multiple SVM model types have been tested by changing the feature number and kernel type. Depression is a leading cause of mental ill health, which has been found to increase risk of early death. Moreover it is a major cause of suicidal ideation and leads to significant impairment in daily life. Emotion artificial intelligence is a field of ongoing research in emotion detection, specifically in the field of text mining. The advent of internet based media sources has resulted in significant user data being available for sentiment analysis of text and images. This paper aims to apply natural language processing on Twitter feeds for conducting emotion analysis focusing on depression. Individual tweets are classified as neutral or negative, based on a curated word-list to detect depression tendencies. In the process of class prediction, support vector machine and Naive-Bayes classifier have been used. The results have been presented using the primary classification metrics including F1-score, accuracy and confusion matrix.

KEYWORDS:- support vector machine, Twitter tweet.

I. INTRODUCTION

If a person does not reconcile the demands he/she has made with his/her ability to deal with them, then mental health distress triggers depression. There are two types of problems here. Depression is characterized as positive depression[1], and depression happens when depression impacts life adversely. Long-term depression refers to problems with mental well-being or various diseases. Daily routine is affected by depression in such a way that it hinders a person, mentally, academically, physically, financially, socially. Depression, particularly many forms of cardiovascular disease, can lead to different kinds of health problems. We used three main features of TWEETER TWEET to feel pain: QT interval, in term RR and in-term ED RR (TWITTER TWEETDe-rived Respiration). People who have anxiety disorders can see the prolongation of the QT time. The nervous system has been affected by depression. No study on the diagnosis of depression using biosignals by machine learning has been conducted to the best of our understanding, and previous studies will not be thorough. While many agencies and institutions have mental health services and aim to change the climate in the workplace, the crisis is far from being regulated. In this research, we would like to use machine learning approaches to explore the causes of depression in working adults and to minimize variables that have a major effect on the extent of depression. With the rapid development of radio networking technologies, the field of wireless communication networks has become a combination of heterogeneous networks of different types. As a result, the development and utilization of multimode mobile terminals has expanded worldwide interest in the area of wireless networking. Multi-mode and multi-band smartphone antennas are therefore needed for both current and future terminal devices, especially those with MIMO (multiple-input-multiple-output) systems. Good reciprocal coupling between antenna components is inevitable due to the limited volume size of mobile terminal devices (such as mobile phones), which affects the efficiency of the antenna and also influences the correlation. Therefore, it is appropriate for the MIMO system to apply the decoupling technique between the antenna components. For the MIMO system, a number of techniques have been reported to minimize the high degree of reciprocal connection between two components of the antenna array. Other conventional methods, such as the protrusion of a single or dual field, are used in these techniques, in addition to loading a slit into the earth.



II. OVERVIEW

If a person is unable to balance the demands set on him/her with his/her ability to deal with them, then mental health pressure induces depression. Two types of problems arise. Depression is characterized as constructive depression, and depression is when depression negatively impacts life. Depression's long-term durability extends to mental wellbeing disorders or the occurrence of multiple diseases. Depression impacts the daily routine in such a way that it hampers a person emotionally, academically, psychologically, financially, professionally. Depression, particularly many kinds of cardiovascular diseases, can lead to various forms of health problems. We used three important Twitter tweet characteristics to diagnose discomfort: QT interval, RR in-terval and ED RR in-terval (Twitter tweet De-ri-ved Respiration). The QT interval prolongation can differentiate persons who have depressive disorders. Your nervous system is affected by depression. There has been no work performed on the detection of depression through machine learning using bio signals to the best of our understanding, and previous experiments are not going to be comprehensive. Although several companies and institutions provide programs relating to mental health and seek to facilitate the working atmosphere, the topic is far from controlled. In this study, we would like to use machine learning methods to explore the mechanisms of depression in working adults and to narrow down the factors that have a strong impact on the levels of depression.

III. PROBLEM STATEMENT

There is no such system now for a few days such as depression diagnosis currently which person has depression they are planning to suicide so that the subsidy ratio often rises due to depression so that we design this method to diagnose individual depression. And reduce the ratio of suicides.

IV. MOTIVATION

The primary aim of such research is to make the human-machine interface more versatile and easier for the user. When assessing aging, human experts would have privileged expertise that codes the facial characteristics of ageing, such as smoothness, face texture, skin acne, wrinkles, and under-eye bags. For test photos in automated age estimates, privileged information is inaccessible. We hypothesize that asymmetric data may be used to solve this issue. To boost the generalizable, explored and manipulated form of the learned model.

V. LITERATURE SURVEY

[1] A Study and Comparison of Prediction Algorithms for Depression Detection among Millennials: A Machine Learning Approach,

Author: Madhurima Hooda, Aashie Roy Saxena.

Description: Depression is a crucial concern in different ways that may impact individuals. There are different therapies to help persons who suffer from depression, but the difficulty here is to predict others who do not yet know they suffer from depression. Thus, such models are prepared to forecast depression in individuals, detailing three main models in this article: a) Using Computer Learning Classifiers and WEKA, b) Using Methods of Imaging and Machine Learning, c) Using Risk Factors. Depressive illness renders individuals unfit not just physically but also psychologically. It has different impacts on people's quality of life. In comparison, depression doesn't need to be at higher levels to affect the life of an individual. Many research studies are on depression prediction and the three main approaches were analyzed from those past studies to determine the most reliable approach among all of them. The most reliable and effective approach was the Bayesnet Classifier for Percentage Split testing choice after researching machine learning classifiers, Feature Reduction Method, Cross Validation Method, Risk Factors. Different data sets may be used to evaluate the predictive model output. For improved accuracy, other approaches may be tried for this estimation of depression in the future.

Summary: Depression impacts the daily routine in such a way that it hampers a person emotionally, academically, psychologically, financially, professionally.

[2] Detection Possibilities of Depression and Parkinson's disease Based on the Ratio of Transient Parts of the Speech.

Author Name: Gabor Kiss, Artúr Bendegúz Takács, Dávid Sztahó, Klára Vicsi.

Description: Speech synthesis is a difficult and dynamic method in the brain. Often, the voice of subjects with mental or neurological disorders such as Parkinson's disorder or depression is distinctive from that of healthy daily speech speakers. Their level of speech is typical of being slow, and their articulation is imperfect. In order to become



monotonous and minimize the rate of sudden and broad alterations, the speech product is altered by these modifications. In the case of depression and Parkinson's disease, this study explored how the proportion of temporary sections is affected. From fit, stressed and sick Parkinson's speakers, a total of 321 speech samples were analyzed. The transient sections were found in their speech using an automated transient detection system and the transient component ratio (RoT) based on the detection was determined. In the case of depressed and Parkinson's affected speakers, the mean value of RoT was observed to decrease by 9-10 percent relative to stable speakers. In the case of healthy and non-heathy speakers (depression and Parkinson's disease), the RoT was used as the only input from classification tests and obtained very good results with an accuracy of 81 percent for the distinction of healthy and non-healthy speakers. Based on an automated recognition method that identifies large and rapid changes in expression, transient sections were measured. As a natural result of articulation, these occasional fragments of speech can typically be found in voice transitions. Neurological speakers can have problems with proper articulation, especially co-articulation, which is one of the most complicated aspects of the speech process. We hypothesized, thus, that, relative to stable speakers, the duration of the transient sections varies in their expression. In this research, 190 balanced speaker speech samples, 55 stressed speaker speech samples, and 76 Parkinson's diseased speaker speech samples were tested. The average importance of the RoT of non-healthy speakers was assessed.

Summary: Speech synthesis is a difficult and dynamic method in the brain. In the case of depression and Parkinson's disease, this study explored how the proportion of temporary sections is affected.

[3] Clinical Depression Detection in Adolescent by Face.

Author: Prajakta Bhalchandra Kulkarni, Minakshee M. Patil.

Discription: In the nation, depression is a secret and destructive disorder. The World Health Organisation (WHO) said that there were 300 million people suffering from depression in 2017. The proportion of depression among teenagers in India is between 0.3 and 1.2. It would also have a detrimental effect on their lives. Depression exists for various reasons, such as the hectic everyday life, the loss of a loved one, fatigue, etc. Little signs of depression are feelings of hopelessness, fear, no interest in any task, loss or weight gain. If the stress stage lasts more than one to two weeks, this period is referred to as depression. Depression can impact social life, fitness, psychiatric disturbance and suicidal thoughts if it takes a serious form. If the depressive stage is identified early, there may be a chance to save the person from depression. That word is known as clinical depression when depression becomes more than the mild to moderate type. In our article, without the aid of a doctor, we present the technique of depression diagnosis that is harmless, simple and more reliable. Two algorithms, dubbed the Fisher vector algorithm and LTrP, were used to apply a depression detection strategy. For the representation and definition of an image, the Fisher vector is used. Using the Gaussian model of mixture (GMM). The efficiency of encoding the fisher vector for a computation is excellent. Also with the linear classifier, it provides a stronger outcome. We applied the algorithms to a face. LTrP is used for feature extraction. In terms of dimensions, the local tetra pattern uses a center pixel with its neighborhood pixel as a reference pixel and then gives a magnitude as well as a tetra pattern. The fish vector encoding is determined for a better and more detailed classification result. The demerits of Bow, which is a word pocket, were left by Fisher vector encoding. And LTrP left the Local binary pattern demerits and offers the best performance. This approach gives the outcome of the classification in the form of 'Depressed' or 'Not depressed'.

Summary: Depression can impact social life, fitness, psychiatric disturbance and suicidal thoughts if it takes a serious form. If the depressive stage is identified early, there may be a chance to save the person from depression.

[4] Multimodal Spatiotemporal Representation for Automatic Depression Level Detection.

Author: Mingyue Niu, Student Member, IEEE, Jianhua Tao, Senior Member, IEEE.

Discription: Physiological studies have shown that there are some differences in speech and facial activities between depressive and healthy individuals. Based on this fact, we propose a novel Spatio-Temporal Attention (STA) network and a Multimodal Attention Feature Fusion (MAFF) strategy to obtain the multimodal representation of depression cues for predicting the individual depression level. Specifically, we firstly divide the speech amplitude spectrum/video into fixed-length segments and input these segments into the STA network, which not only integrates the spatial and temporal information through attention mechanism, but also emphasizes the audio/video frames related to depression detection. The audio/video segment-level feature is obtained from the output of the last full connection layer of the STA network. Secondly, this paper employs the eigen evolution pooling method to summarize the changes of each dimension of the audio/video segment-level features to aggregate them into the audio/video level feature. Thirdly, the multimodal representation with modal complementary information is generated using the MAFF and inputs into the support vector regression predictor for estimating depression severity. Experimental results on the AVEC2013 and AVEC2014 depression databases illustrate the effectiveness of our method.



Summary: we firstly divide the speech amplitude spectrum/video into fixed-length segments and input these segments into the STA network, which not only integrates the spatial and temporal information through attention mechanism, but also emphasizes the audio/video frames related to depression detection.

[5] A novel depression detection method based on pervasive EEG and EEG splitting criterion.

Author: Jian Shen¹, Shengjie Zhao¹, Yuan Yao¹, Yue Wang¹, Lei Feng.

Discription: Depression is a mental disorder characterized by persistent occurrences of lower mood states in the affected person. According to the study of World Health Organization (WHO), depression will become the second largest cause of illness threatening the life of human beings in 2020, so early detection, early diagnosis and early treatment of depression is very important to save the health and life of human beings. In order to alleviate the damage caused by depression and make early detection, early diagnosis and early treatment of depression, a portable and accurate depression detection and diagnosis method is most necessary. Due to the highly complexity, nonlinearity and non-stationarity of electroencephalogram (EEG) data in nature, we present a novel method for pervasive EEGbased detection and diagnosis of depression with the resting state eye-closed EEG data of Fp1, Fpz and Fp2 locations of scalp electrodes, which are closely related to emotion, collected through three-electrode pervasive EEG collection device in this paper. Experiment has been conducted and totally 170 (81 depressive patients and 89 normal subjects) subjects' pervasive EEG data have been collected in resting state and eye-closed. Then, Support Vector Machine (SVM) is utilized to analyze the pervasive EEG data and the average accuracy reaches 83.07%. After Friedman Test and post-hoc two-tailed Nemenyi Test, we propose a splitting criterion for pervasive EEG. The data analysis experimental results show that the proposed method for detecting and diagnosing depression is effective and convenient, and it also demonstrate that the three-electrode pervasive EEG collection device has broad prospects in depression detection and diagnosis.

Summary: Depression is a mental disorder characterized by persistent occurrences of lower mood states in the affected person. so early detection, early diagnosis and early treatment of depression is very important to save the health and life of human beings.

[6] Multi-Modal Depression Detection and Estimation.

Author: Le Yang.

Discription: Critical problems in Western society include depression and anxiety disorders. WHO studies indicate that there is depressive depression in about 12.8% of the world's population. In this work, we propose a variety of novel approaches to multimodal evaluation and forecasting depression. Our previous studies, in particular, looked at multimodal features and multimodal fusion methods, and the experimental results revealed that the proposed classification and evaluation of the multimodal hybrid depression fusion system produced promising efficiencies. Current study has two dimensions: 1) The Generative Adversarial Network (GAN) is used to improve the audio characteristics of depression in order to optimize the efficiency of the depression severity measurement in order to reduce the effect of lack of evidence on training depression models. 2) A new FACS3DNet is proposed to merge 3D and 2D convolution networks for identification of the facial action unit (AU). This is the first paper to apply CNN 3D to the issue of AU detection, as far as we know. Our future research will focus on 1) combining depression prediction with dimensional affective analysis through the proposed FACS3DNet and 2) assembling a Chinese depression database. Upon conclusion, the dissertation of the author will consist of these observations. My research focuses mainly on three points: (1) investigating active multimodal features and strategies for adjusting multimodal depression identification; (2) mitigating the impact of lack of data on deep depression model training; (3) combining depression prediction with dimensional affective analysis. In the first stage of the study, we note that, if depression classification and depression prediction were taken into account at the same time, improved outcomes could be achieved. In particular, the text characteristics (language information) have a beneficial effect on the classification of depression, while audio and video can be used to provide the basis for a preliminary estimate of depression. For the second stage of the analysis, the DCGAN-based data generation approach effectively improves the reliability of depression estimation and also gives some new insights into the development of depression data. We've also begun assembling a Chinese depression index. In the third stage of the study, which will be our future work, we will adopt the new FACS3D-Net to merge depression estimation and dimensional affective analysis at the same time. We think this study will offer a new perspective into the identification of depression.

Summary: we propose a variety of novel approaches to multimodal evaluation and forecasting depression. Our previous studies, in particular, looked at multimodal features and multimodal fusion methods, and the experimental results revealed that the proposed classification and evaluation of the multimodal hybrid depression fusion system produced promising efficiencies.



[7] Quantification of depression disorder using EEG signal

Author: MojtabaHajian, Mohammad Hassan Moradi.

Discription: Depression, which has been a growing concern in the world of science, is one of the most prominent psychological diseases. A numerical measure is offered to the patient in mental health questionnaires, such as Beck's questionnaire. The study showed that the degree of depression in people is associated with biochemical changes in the brain, so it is possible to diagnose the intensity of depression by observing brain signals. This paper proposes a process by which the beck index for each subject is determined by gathering the particular characteristics of the patient's EEG signal. An algorithm that uses membership values extracted from the fuzzy classifier and the support vector machine has been developed and introduced to calculate depression (SVM). Desirable results have been obtained in this process, indicating that the suggested algorithm has a fair capacity to measure the numerical depression index. The findings were obtained with a percent relative difference (PRD) of 5 percent and a Pearson correlation of 0.92. The findings of the experiments show that, compared to the initial beck number, the estimated numerical value of the built system is a high correlation and a low PRD relative to each organism.

Summary: A process by which the beck index for each subject is determined by gathering the particular characteristics of the patient's EEG signal. An algorithm that uses membership values extracted from the fuzzy classifier and the support vector machine has been developed and introduced to calculate depression (SVM).

[8] PREDICTION OF DEPRESSION FROM EEG SIGNAL USING LONG SHORT TERM MEMORY(LSTM)

Author: S.Dhananjay Kumar, Subha DP

Discription: Depression, the leading cause of disability globally, is a neurological disorder. EEG records have been widely used in the diagnosis and analysis of different neurological conditions, including depression. In this paper, deep learning models for LSTM (Longshort Term Memory) are used in the prediction of depression trends for the next time, based on the extracted features. Using moving window segmentation from the acquired EEG signals, the statistical time-domain feature encompassing the mean amplitude of the data is extracted. The model uses one LSTM layer for the forecast with 10 hidden neurons. For the training of the model, 5600 sample means were used out of a total of 7000 mean values calculated from the sample of 30 patient records from each resting state. The proposed LSTM network with a root mean square error of 0.000064 could accurately predict the next 1400 sample mean values. CNNLSTM and ConvLSTM are compared to the performance of the model. It is noted that the LSTM predictor model is best suited for predicting depression trends.

Summary: Deep learning models for LSTM (Longshort Term Memory) are used in the prediction of depression trends for the next time, based on the extracted features.

[9] AUTOMATIC DEPRESSION DETECTION VIA FACIAL EXPRESSIONS USING MULTIPLE INSTANCE LEARNING

Author: YanfeiWang, JieMa, BiboHao, PengweiHu, XiaoqianWang, JingMei, Shaochun Li

Discription: Depression affects more than 300 million people globally and is the primary cause of disability for people between the ages of 15 and 44 in the USA. According to the WHO study, its harm is comparable to most prevalent diseases such as cancer, diabetes, or heart disease. However, due to access restrictions, people with signs of depression often do not undergo proper care. In this article, we suggest a tool that automatically diagnoses depression using only facial expression landmarks that are easy to obtain with less exposure to privacy. Via the combination of feature manipulation and multiple instance learning, we work with the coarse-grained labels, i.e. one final mark for the long-term sequence video samples, which are the typical cases in applications. Our method's success is contrasted with visual-based approaches, and our approach also outperforms multi-modal techniques that use different modalities.

Summary: In this article, we suggest a tool that automatically diagnoses depression using only facial expression landmarks that are easy to obtain with less exposure to privacy.

[10] Horse Depression analysis using biomechanical modelling and machine learning approach.

Author: K. Tamilarasi.

Discription: In the equestrian sector, horse transport is a common practice, especially with the growth of this sector from around the world. Analysis has shown that the levels of thigh depression, which also exceed the levels of depression induced by training during competitive horse races, are responsible for moving horses by road. Depression symptoms are reflected in the physiological mechanisms of horses that cause fatigue or damage to horses. The horses remain in a tiny box during shipping in order to preserve protection and prevent spills or injury. The weight is borne by the four limbs as the vehicle passes, and the vibratory forces begin to disturb the equilibrium. The horse blood pumping mechanism works to provide enough oxygen to the lungs, enabling the heart to pump at high speeds. The paper suggests a theoretical biomechanical model for vibration forces to explain how these forces pass through the limbs of

horses. The structure is designed to match friction forces with high levels of depression during transport. Such a clear correlation between car friction forces or high levels of depression can lead to a low-cost, non-invasive early depression monitoring device without the need to assess the animal's immediate physiological reaction. This partnership will also bring to light the importance of streamlined vehicle construction to minimize vibration.

Summary: . In this Project, we suggest a tool that automatically diagnoses depression using only facial expression landmarks that are easy to obtain with less exposure to privacy.

VI. SYSTEM ARCHITECTURE

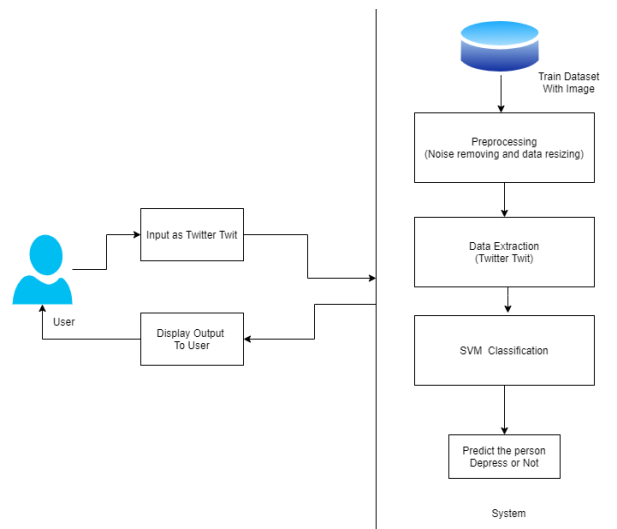


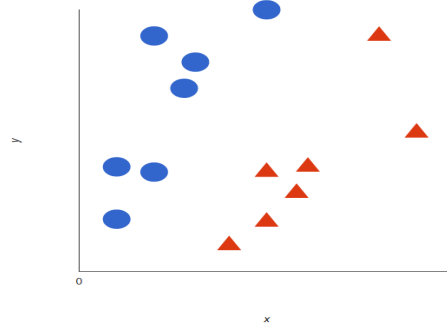
Fig: System Architecture

MODULE

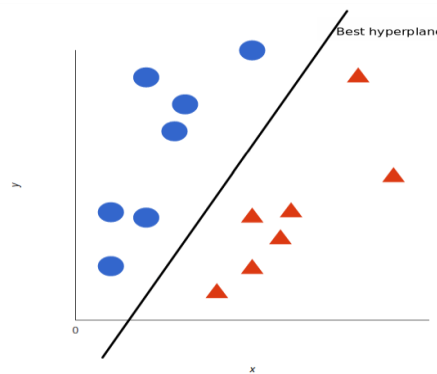
- Prepossessing :**
 In this Module Machine will be processing on given Input. In prepossessing machine will train the data-set, removing Noisy part of given input. and then resize the data-set
- Feature Extraction:**
 In this module user will give Twitter tweet that attribute give to machine.
- Classification:**
 User testing value classify with train data-set using SVM Algorithm(support vector Machine Algorithm).Machine Learning will predicate given input of person is Depression or not. To getting more accuracy, here we use machine learning with SVM (support vector Machine Algorithm).

- SVM WORKING(Support Vector Machine):**

The basics of Support Vector Machines and how it works are best understood with a simple example. Let's imagine we have two tags: red and blue, and our data has two features: x and y. We want a classifier that, given a pair of (x,y) coordinates, outputs if it's either red or blue. We plot our already labeled training data on a plane:



A support vector machine takes these data points and outputs the hyperplane (which in two dimensions it's simply a line) that best separates the tags. This line is the decision boundary: anything that falls to one side of it we will classify as blue, and anything that falls to the other as red.



VII. CONCLUSION

In this Project, various Depression detector models were fitted with multiple Tweeter tweet. Features such as QT interval, RR. This method of detecting stress of the TWITTER TWEET signal would enable A person from He/she will be able to take the measures needed to assess one's psychological condition and also physical health. It has also been concluded that the more characteristics we use, the more detailed the model becomes.

REFERENCES

- [1] Y. Kwon and N. Lobo, " Age classification from facial images," in Proc. IEEE Conf. Comput. Vis. Pattern Recognit., Seattle, WA, USA, Jun. 1994, pp. 762– 767.
- [2] Y. Kwon and N. Lobo, " Age classification from facial images," Comput. Vis. Image Understand., vol. 74, no. 1, pp. 1– 21, 1999.
- [3] W. B. Horng, C. P. Lee, and C. W. Chen, " Classification of age groups based on facial features," Tamkang J. Sci. Eng., vol. 4, no. 3, pp. 183– 192, 2001.
- [4] J. Hayashi, M. Yasumoto, H. Ito, Y. Niwa, and H. Koshimizu, " Age and gender estimation from facial image processing," in Proc. 41st SICE Annu. Conf., vol. 1. Osaka, Japan, Aug. 2002, pp. 13– 18.
- [5] A. Lanitis, C. Taylor, and T. Cootes, " Toward automatic simulation of aging effects on face images," IEEE Trans. Pattern Anal. Mach. Intell., vol. 24, no. 4, pp. 442– 455, Apr. 2002.
- [6] Fevre, Mark Le; Kolt, Gregory S.; Matheny, Jonathan, " EuDepression, diDepression and their interpretation in primary and secondary occupational Depression management interventions: which way first?" . Journal of Managerial Psychology, 2006, 21 (6): 547 -565. doi:10.1108/0268390610684391.
- [7] Das S, O' Keefe J. " Behavioral cardiology: recognizing and addressing the pro- found impact of psychosocial Depression on cardiovascular health" . Curr Atheroscler Rep. 2006; 8:111-



- [8] Shusterman V, Aysin B, Gottipaty V, Weiss R, Brode S, Schwartzman D, Anderson KP. “ Autonomic Nervous System Activity and the Spontaneous Initiation of Ventricular Tachycardia.” *ESVEM Investigators. Electrophysiologic Study Versus Electrocardiographic Monitoring Trial. J Am Coll Cardiol.* 1998; 32:1891-9. 73
- [9] Brodsky MA, Sato DA, Iseri LT, Wolff LJ, Allen BJ. “ Ventricular Tach- yarrhythmia Associated with Psychological Depression.” *JAMA.* 1987; 257:2064-7 PPCT-FIM: prepost computation tree based Frequent itemset mini.
- [10] Leenhardt A, Lucet V, Denjoy I, Grau F, Ngoc DD, Coumel P. “ Cate- cholaminergic polymorphic ventricular tachycardia in children. A 7-year follow- up of 21 patients.” *Circulation.* 1995;91:1512-9.
- [11] Brunckhorst CB, Holzmeister J, Scharf C, Binggeli C, Duru F. “ Depression, de- pression and cardiac arrhythmias.” *Ther Umsch.* 2003;60:673-81. DGOI
- [12] Jostas . Tsiouris, Vasileios C. Pezoulas, Michalis Zervakis, Spiros Konitsiotis, Dimitrios I. Fotiadis “ A Long Short- Term Memory deep learning network for the prediction of epileptic seizures using EEG signals” *journal of Computers in Biology and Medicine* ,pp.24– 37,2018
- [13] Jie Zhou, Ming Meng, Yunyuan Gao, Yuliang Ma, Qizhong Zhang “ Classification of Motor Imagery EEG Using Wavelet Envelope Analysis and LSTM Networks” .*The 30th Chinese Control and Decision Conference*, Access IEEE, vol 6,pp.79050-79059,2018
- [14] Jiamin Liu¹, Yuanqi Su, and Yuehu Liu, “ Multi-modal Emotion Recognition with Temporal-Band Attention Based on LSTM-RNN” *Pacific Rim Conference*, pp. 194– 204, 2017.
- [15] Lizhe Liu, Weiting Chen, Guitar Cao “ Prediction of neonatal amplitude-integrated EEG based on LSTM method” , *IEEE International Conference on Bioinformatics and Biomedicine (BIBM)*, pp. 497-500 2016.



INNO  **SPACE**
SJIF Scientific Journal Impact Factor

**Impact Factor:
7.512**

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

 **9940 572 462**  **6381 907 438**  **ijirset@gmail.com**



www.ijirset.com

Scan to save the contact details